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BIRDS-EYE VIEW OF MASSACHUSETTS TEACHER MATERIALS

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THE COMMONWEALTH MUSEUM
at Columbia Point, 220 Morrissey Boulevard,
Boston, MA 02125 (617) 727-9268



A Division of the Office of the Secretary of State,
Michael Joseph Connolly, Secretary

904/18

BIRDS-EYE VIEW OF MASSACHUSETTS



"A Bird's-Eye View of Massachusetts" is a traveling exhibit of the Commonwealth Museum which was originally displayed at Columbia Point in 1986-87. Since then it has been traveling throughout the state and is available to such educational institutions as museums, schools and libraries. For further information on procedures for exhibit borrowing, contact the Museum number below.

This booklet was produced as a teacher supplement to help prepare students for viewing the exhibit, and to follow-up such viewing with classroom activities. Although parts of the educational material relate specifically to the exhibit, most of it is relevant for anyone concerned about the future of birds of Massachusetts.

Commonwealth Museum at Columbia Point
A Division of the Office of the Secretary of State
Michael Joseph Connolly, Secretary
220 Morrissey Boulevard
Boston, MA 02125
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Background Information

The Commonwealth Museum's exhibit, "A Bird's-Eye View of Massachusetts," looks at the changing status of the birds of Massachusetts from the 1920's to today. The 1920's perspective is provided by the three-volume study, *The Birds of Massachusetts and Other New England States*, written by State Ornithologist Edward Howe Forbush, and featuring the beautiful bird portraits by Louis Agassiz Fuertes, commissioned by the Commonwealth. Today's perspective is told through case studies of selected birds, the places they inhabit, and how both have changed because of interaction with people.

Status in the 1920's:



In the 1920's the State Ornithologist was under the Department of Agriculture where the birds were viewed in economic terms — either of value as game birds or consumers of agricultural pests, or of detriment as pests to be controlled. But State Ornithologist Edward Howe Forbush had a broader understanding and vision.

When Forbush began the state birds study, he was seventy years old with many years of work in the field and laboratory behind him. A self-taught ornithologist, he was a careful researcher and tireless worker who consulted with over a thousand people throughout the world. Because the Massachusetts birds did not recognize political boundaries, he included all of New England as a study area, although his main thrust was on Massachusetts which "lies directly across the region."

Forbush was driven to complete the monumental study by the conviction that the birds of Massachusetts were in trouble and needed help in keeping their place. He died during the final stages of editing the third volume.

In the 1920's Forbush was in the forefront of those sounding the alarm for bird protection, along with the Massachusetts Audubon Society, bird clubs and individuals such as Louis Agassiz Fuertes. As a result of pressures from many sources, legislation began to be enacted to protect endangered birds and to create bird sanctuaries.

Louis Agassiz Fuertes:

A contemporary of Forbush, Fuertes has done more to promote bird appreciation than any other artist except John James Audubon. He was able to make his living from his chosen work, wildlife portraits, and he was prolific during his lifetime. Although his pictures have been widely featured on everything from cereal boxes to children's books as well as the more prestigious bird identification books, his name has been known in "bird circles" mainly where he has been recognized as a bird artist without peer.

In 1927 before work on the third volume was completed, Fuertes was killed in a car accident. The second volume, then being published, contained this tribute to Fuertes by Dr. Frank M. Chapman: "Fuertes' drawings for the 'Birds of Massachusetts', his last published work, are conceded to be finer than any illustrations he had previously painted." Fuertes considered himself an artist and naturalist rather than an illustrator. The showing of some of his paintings in this exhibit will further recognition of his talents as a natural artist.

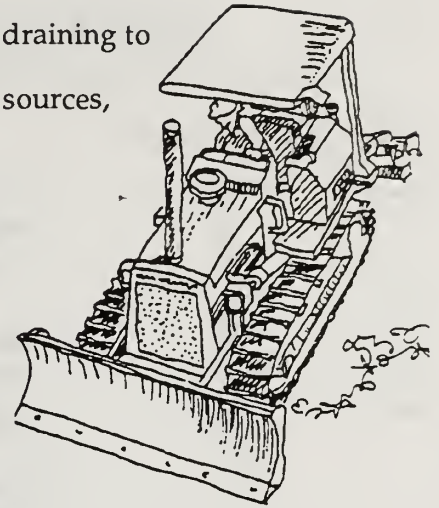
The Status of Massachusetts' Birds Today:

The use of selected birds as case studies in this exhibit allows the Museum to focus in a simple yet dramatic way on the changes in the last sixty years. Each bird selected combines several criteria: its portrait has been painted by Fuertes; its status and numbers have changed as a result of sharing its habitats with people; it can represent a particular kind of habitat in one part of the state; and its name can be recognized by the average citizen.

As a result, six birds from three regions are featured in the exhibit: the peregrine falcon and the herring gull in eastern Massachusetts; the evening grosbeak and game birds in central Massachusetts; and the common loon and the pileated woodpecker in western Massachusetts. The exhibit shows how these birds and their places have been changing because of activities of people.

Ways People are Hurting Birds:

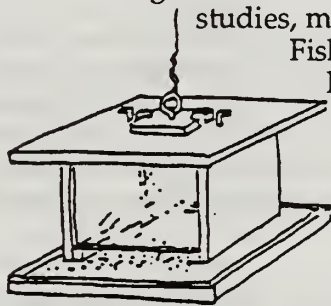
- * Destruction of habitat by road construction, housing and industrial development on existing land.
- * Destruction of habitat by wetlands filling and draining to create new land.
- * Pollution of the air, land and water by energy sources, toxic wastes, solid wastes, and acid rain.
- * Pesticide poisoning affecting birds directly or through the food chain.



Ways People are Helping Birds:

- * Preservation of habitat (sanctuaries and conservation lands), here and on wintering grounds.
- * Laws to regulate hunting, protect endangered birds, etc.
- * Plantings and feedings to attract birds.
- * Bird banding and life studies to better understand biological patterns and needs.
- * Wildlife rehabilitation for injured birds (from oil spills, lead poisoning, etc.).

In order to better explain today's picture in an exhibit, information was sought from the state agencies responsible for bird census and life studies, management and protection: the Massachusetts Fisheries and Wildlife and the Massachusetts Natural Heritage Program. Close collaboration with these agencies and the Massachusetts Audubon Society made the exhibit possible.



Bird Facts

How many species of birds are in the world? What is their population?

Roughly 8700 species with a population of over 100 billion.

How many species are in North America? What is their population?

Over 700 species with a population of between 12-15 billion.

How many species are water birds and how many are land birds?

Roughly 40% water and 60% land birds.

What distinguished birds from other animals?

Their feathers, which are modified scales. Birds are egg-laying, warm blooded animals with feathers, wings and hollow backbones.

When did birds first inhabit the earth?

No one knows exactly. However, Archaeopteryx appeared about 130 million years ago during the Jurassic Period when dinosaurs and flying reptiles were still on the land. Fossil bones and feathers of this extinct species, found in slate in Germany, are now in the British Museum. Fossils of even older species are under study.

How many Massachusetts breeding birds have become extinct in the last 100 years? Why did they become extinct?

(2) Passenger Pigeon and Heath Hen. From over-hunting and loss of critical habitat.

What is the biggest living bird?

The ostrich stands 8-9 feet tall and weighs three hundred pounds or more.

What is the smallest bird?

The male bee hummingbird of Cuba is only 2 1/4" long and weighs less than an ounce.





How many endangered or threatened species or species of special concern are in Massachusetts?

30. (List below from Massachusetts Natural Heritage Program. as of Jan. 1990)

COMMON NAME	SPECIES	STATUS CODES
Common Loon	<i>Gavia immer</i>	SC
Pied-billed Grebe	<i>Podilymbus podiceps</i>	T
Leach's Storm-petrel	<i>Oceanodroma leucorhoa</i>	E
American Bittern	<i>Botaurus lentiginosus</i>	SC
Least Bittern	<i>Ixobrychus exilis</i>	T
Cooper's Hawk	<i>Accipiter cooperii</i>	SC
Sharp-shinned Hawk	<i>Accipiter striatus</i>	SC
Northern Harrier	<i>Circu cyaneus</i>	T
Bald Eagle	<i>Haliaeetus leucocephalus</i>	FE,E
Peregrine Falcon	<i>Falco peregrinus</i>	FE,E
Common Moorhen	<i>Gallinula chloropus</i>	SC
King Rail	<i>Rallus elegans</i>	T
Piping Plover	<i>Charadrius melodus</i>	FT,T
Upland Sandpiper	<i>Bartramia longicauda</i>	E
Eskimo Curlew	<i>Numenius borealis</i>	FE,E
Least Tern	<i>Sterna antillarum</i>	SC
Roseate Tern	<i>Sterna dougallii</i>	FE,E
Common Tern	<i>Sterna hirundo</i>	SC
Arctic Tern	<i>Sterna paradisaea</i>	SC
Common Barn Owl	<i>Tyto alba</i>	SC
Short-eared Owl	<i>Asio flammeus</i>	E
Long-eared Owl	<i>Asio otus</i>	SC
Sedge Wren	<i>Cistothorus platensis</i>	E
Loggerhead Shrike	<i>Lanius ludovicianus</i>	E
Henslow's Sparrow	<i>Ammodramus henslowii</i>	E
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	SC
Northern Parula Warbler	<i>Parula americana</i>	T
Blackpoll Warbler	<i>Dendroica striata</i>	SC
Mourning Warbler	<i>Oporornis philadelphia</i>	SC
Golden-winged Warbler	<i>Vermivora chrysoptera</i>	E

STATUS CODES: as determined by the Division of Fisheries and Wildlife under the Massachusetts Natural Heritage Program.

FE = Listed as Federal Endangered by U.S. Fish and Wildlife Service

FT = Listed as Federally Threatened by U.S. Fish and Wildlife Service

E = Endangered - in danger of extinction from the Commonwealth

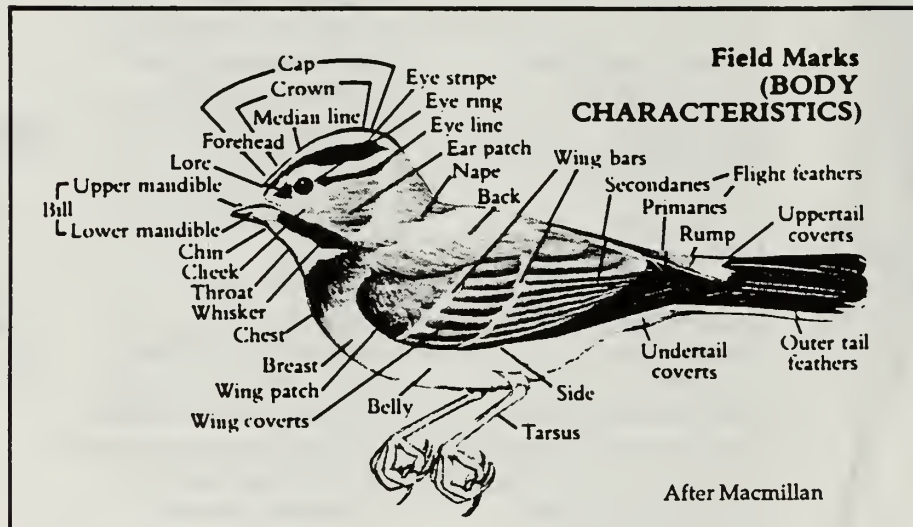
T = Threatened - rare or declining, could become endangered in Commonwealth

SC = Special Concern - suffering decline that could threaten species, or occurs in such small numbers and restricted distribution it could become threatened.

Pre-Visit Activities

Grades 3-8
(Adapt for Older)

A. Study the parts of the bird: Enlarge the diagram below or select your own to make a classroom chart on bird characteristics. Emphasize how particular parts differ in different species, and how these differences help birds adapt to particular habitats.



B. Tips for Identification of Bird Species: Look at the following characteristics in bird identification:

- General body size and shape - compare to sparrow, robin, crow.
- Size and shape of wings, tail, bill, feet, crest/crown, eyes;
- Color and markings;
- Nests and habitats
- Songs and calls;
- Flight pattern and movement;
- Behavior.



After Peterson

Study the characteristics of the six birds highlighted in the Museum exhibit: peregrine falcon; herring gull; ring-necked pheasant and ruffed grouse (game birds); common loon; and pileated woodpecker. Show bird pictures and play bird records from your school library to increase recognition of these birds before you visit the exhibit. Begin a classroom display on these birds.

C. Habitats in Massachusetts: What choices does Massachusetts offer? Consider types of habitats such as offshore (ocean and bays), shore beaches and marshes, ponds and wetlands, fields, woodlands, borders, suburban backyards, urban rooftops and vacant lots. Why do different birds live in different places? Look into the geography, topography and climate of your own area and determine which birds would be best suited to live there. Consider ways to attract them to your school area. Send for information on how to attract birds, as listed on the reference sheet.

D. Home is where the nest is: Within the broader habitat, the specific home territory contains the nest. Have students relate this to their own community, neighborhood and house. Take a walk around the school grounds and look for signs of nests in trees, in shrubs and on the ground. Look for holes in the trees which might serve as homes. This is just a beginning walk to observe the different habitats, neighborhoods and homes on your school grounds and to sharpen the senses. If it is not possible to take this field walk, have students assess the yard environment at home as homework, to discuss later in class. Follow-up activities will explore this theme in more detail.



Some Common Winter Birds in New England

COMMON BIRDS (Capitals)

LESS COMMON BIRDS (Small Type)

NAME OF BIRD	DATE	NUMBER	PLACE	REMARK
Mallard Duck				
Black Duck				
Sparrow Hawk				
Ruffed Grouse				
• PHEASANT				
• ROCK DOVE (pigeon)				
Great Black-backed Gull				
HERRING GULL				
Mourning Dove				
Screech Owl				
Snowy Owl				
• DOWNY WOODPECKER				
• Hairy Woodpecker				
Horned Lark				
• BLUE JAY				
CROW				
• CHICKADEE				
• White-breasted Nuthatch				
Brown Creeper				
• STARLING				
Myrtle Warbler				
• HOUSE SPARROW				
• Evening Grosbeak				
• Purple Finch				
• Goldfinch				
• JUNCO				
• TREE SPARROW				
• Song Sparrow				
Snow Bunting				
• (Cardinal)				
• (Titmouse)				
(Mockingbird)				

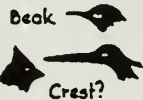
WHAT BIRD
DID YOU SEE?
LOOK AT

SIZE Bigger or
Smaller than
Sparrow
Robin
Crow

SHAPE



of HEAD
Beak



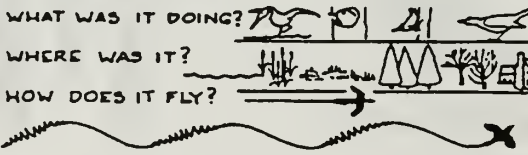
of WINGS



of TAIL



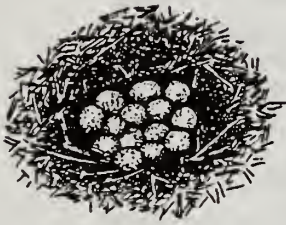
COLOR &
FIELD MARKS



Post-Visit Activities

Grades 3-6

(Adapt for Older)



A. Keep a field journal. Learn to take notes, make drawings and record key characteristics of birds in the field. Notes can be simple remarks on the checklist of winter birds (see p. 8), or more detailed observations in a notebook (see Roth, Drennan references).

B. Learn bird songs and calls. Play bird records and pick out the songs/calls of the six exhibit birds. In the field make tape recordings of songs. Add drawings and field notes to help in later identification in the classroom.

C. Go on a bird home hunt. Look for nests high in tall trees, at eye level in small trees, and near the ground in shrubs and seedling trees. Look for homes. Do not take any bird nests. They are protected by law.

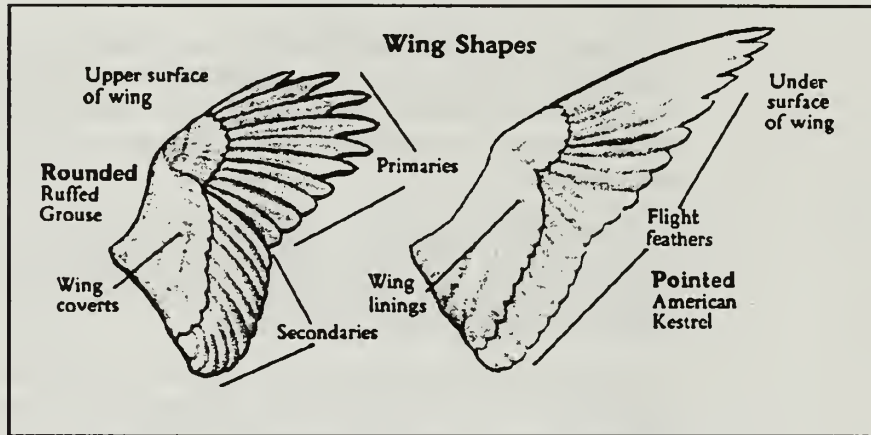
D. Bird nest construction: Study bird nests, their materials and construction. Using information from the exhibit brochure and field guides, take the six birds in the exhibit as examples. Divide the class into six groups and assign a bird to each. Let groups find out how each bird constructs its nest, where it is located and how it relates to the surrounding environment. Then have them make a diorama of the nest within its particular habitat, trying to duplicate construction methods and using similar nest materials. Let all students share what they learned about these bird homes. Compare materials and skills and ability to protect eggs and young.

E. Food supply: What do these same six birds eat? Are they carnivores, herbivores or both? How are they adapted to obtain their food supply? Look closely at their bills (e.g. for tearing meat, for boring into wood, or for cracking seed), their feet (for diving for prey, or for perching on limbs, etc.), and other features.

F. Locate an owl pellet to dissect. What is a pellet? What can it tell you? Owls regurgitate food not digested, including bones and fur. Have a naturalist help you locate a pellet and come into the classroom to dissect it carefully to determine what was in the owl's diet.

G. Make simple bird feeders to attract birds. Use recycled materials as shown on p. 11-12. Experiment with a variety of seeds, nuts and other food to see what different birds eat.

H. Study feathers for flight and insulation. Which birds fly fastest, slowest? How many feathers do birds have and which feathers are used for flight, which for insulation? Does the shape of wings (round, pointed, short, long, etc.) affect flight ability?



I. Observe behavior at window feeders. Have a classroom lookout station, and assign brief notetaking periods. Take periodic visits outdoors to observe bird behavior in an area where plantings and seeds attract birds and a protected area where students can hide the students from view. A bird blind can be made with simple materials. See Roth book for instructions. Observe: flight; territoriality; pecking order; friends and enemies; feeding habits.

Grade 6 & Up:

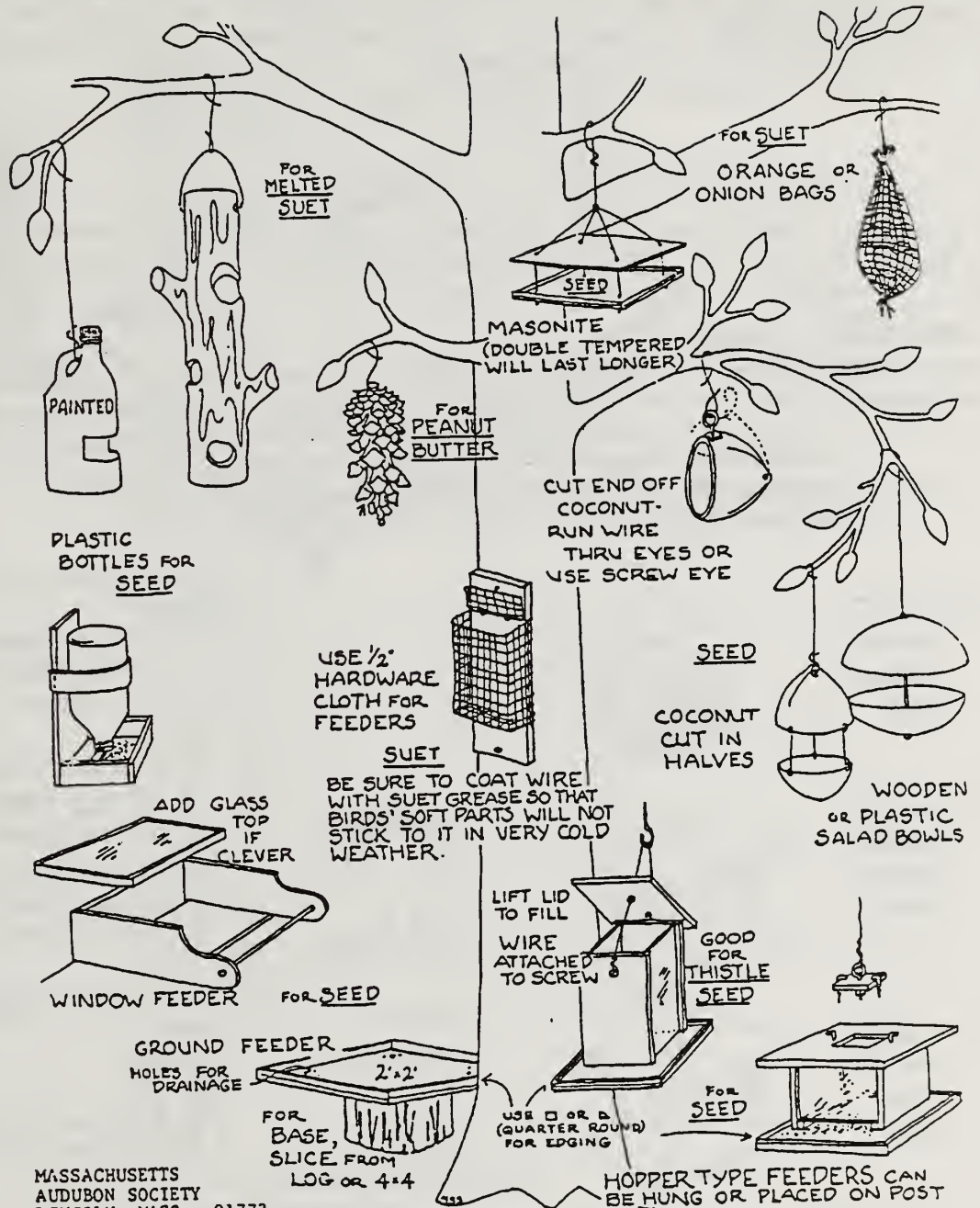
J. Find out travel routes of migrating birds. Some Massachusetts birds are year-long residents, some live here part of the year, and some just pass through. Find examples of breeding birds, birds that migrate here in winter but breed elsewhere, and those that breed here but migrate elsewhere for part of the year. What are the reasons for migration? Find out the migration routes of common Massachusetts visitors and chart them on a map. (See references.) Which travel the greatest distance? Do any migrate west to east or south to north instead of the usual north to south? Combine with geography lesson. Compare with other animals, including people.

K. Rare and endangered birds: Find out about those listed for Massachusetts on p. 5. Look into bird laws and management agencies. Adopt a Massachusetts endangered bird and find ways to help others learn about its plight. Contact agencies on p. 19.

Bird's-Eye View of Massachusetts

Simple Feeders You Can Make

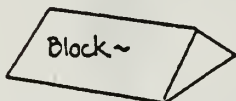
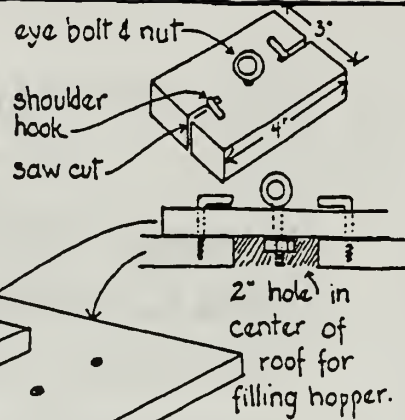
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Hopper Feeders You Can Make

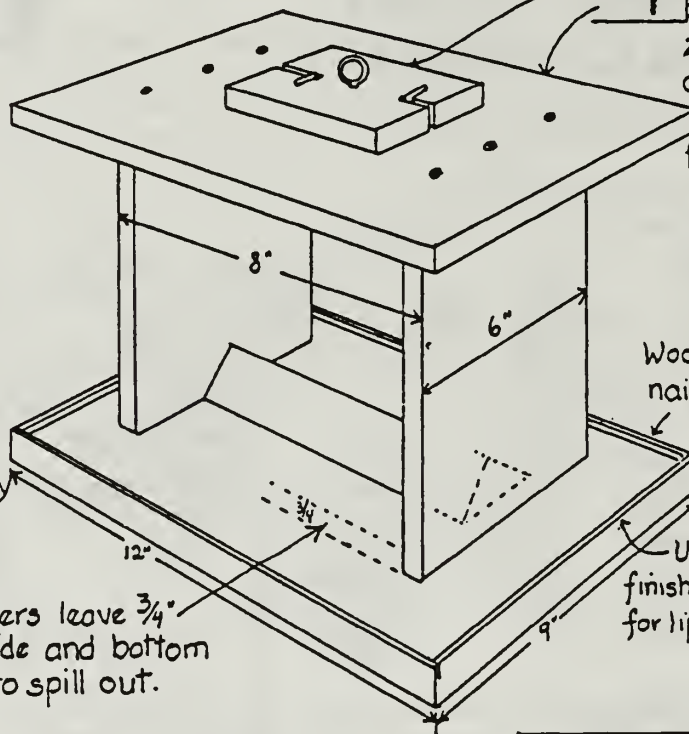
Hopper type feeders can be hung or placed on a post. Dimensions are suggested but you can use any you like.

Basic Unit



Block ~
not absolutely necessary but keeps seed from piling up.

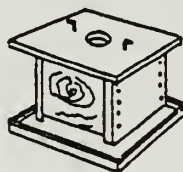
On all feeders leave $\frac{3}{4}$ " between side and bottom for seed to spill out.



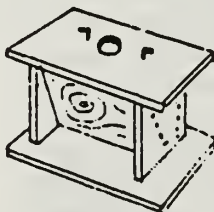
Wooden strips nailed to sides ($1\frac{1}{4}$ " wide)

Use small finishing nails for lip.

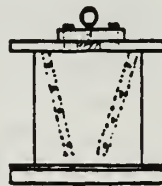
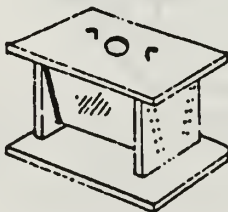
Choice ①
vertical wooden slats



Choice ②
slanted wooden sides



Choice ③
slanted glass sides



Method ①



saw cuts wood blocks to make opening for seed

Fittings ~
Use screws except for small nails to hold lip around base.
2 shoulder hooks will keep hopper cover in place.
An eye bolt and nut are stronger than a screw eye.

Method ②



wooden guides for glass.

JB/MSS

MASSACHUSETTS AUDUBON SOCIETY, LINCOLN, MA. 01773



L. Wildlife management: Use the gull case study to problem-solve a management problem which involves birds and people. (See pp. 14-15) After reading the research questions, brainstorm ideas. Have students research points of view of U.S. Fish & Wildlife Service, Massachusetts Audubon Society, MA Division of Fisheries and Wildlife, MA Natural Heritage Project, affected Cape Cod towns, and any other groups involved. Let students come up with their own management decisions and send their opinions to those groups involved. For additional case studies, the Cranes Beach deer herd management question is suggested or other cases in your community.

In problem-solving, students need to be guided to gather facts, study all sides of the issue, and learn to withhold judgment until all possible alternative actions have been considered. If basic ecological principles are understood, students will try to solve issues in ways in which human actions have a minimum impact on ecosystem health.

M. Study ways people hurt/help birds. Assign the topics from page 3 to students singly or in groups, and have them share the results of their research orally or in displays. Encourage follow-up of results with action such as support of particular legislation, letters to the editor, participation in a hearing, etc., so that a sense of empowerment to promote wildlife conservation is encouraged.

Decision-Making and Wildlife Management



At what point should management programs be introduced to save endangered species or control problem animal populations? Which control approaches provide the best chance of long-term success for the species out of balance, and cause the least impact on the related ecosystem?

Throughout the world, many species have already become extinct because of human activities, and many more are threatened or endangered today. If we decide species survival is important, then steps must be taken to protect such species as the grizzly bear and the California condor, the needs of which are often in conflict with human behavior. There are times when aggressive and even heroic attempts have been made to save a species through captive breeding, removal of predators, preservation of an unusual habitat, or alteration of a specific environment by water impoundment or forest fire.

Overpopulation imbalances have also been caused by humans. Many introduced species have multiplied out of control and have become pests without natural enemies in the new environment, such as the gypsy moth. Quick solutions are often sought which can create new problems. Pesticides are a prime example. A broad brush attack can kill friend and foe alike, and the "pest" returns stronger another day.

Moreover, disagreement on which species are friends and which are foes exists between various groups or governmental agencies. The coyote, for example, was an enemy to sheepherders but a symbol of the wilderness to others. In spite of some defenders, a largescale killing of coyotes took place, with the result that their population was greatly reduced. In the meantime, the small animal population upon which coyotes fed grew wildly and caused other damage to farmers. An understanding of the coyote's larger place in the food chain began to be understood. Predator control can backfire when protected species depend upon people for protection too much. Much has been trial and error in the development of wildlife management policies.

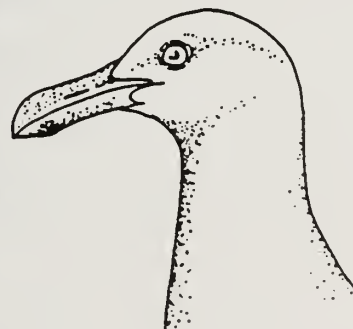
A current wildlife management problem closer to home

involves the herring gull, a species that thrives on the ready food supply people make available in "sanitary landfills," fish processing areas and other waste disposal sites. The dramatic increase in numbers of gulls may threaten the survival of some tern species.

This problem comes into sharp focus on Cape Cod and adjacent islands where tern and gull breeding areas are affected. A master plan for gull/tern management at Monomoy Island Refuge has been proposed by the U.S. Wildlife Service. Other agencies and towns on the Cape with sites containing nesting areas are also considering gull/tern management questions. Conflicting interests of the public are being raised. Animal rights activists are expressing concern about species management vs. treatment of individual animals. Students researching gull/tern management might consider the following questions:

- * How has the problem of gull/tern imbalance come into being?
- * What natural processes are at work that might help restore a balance with time? (e.g. for every eroded sand area, are new areas being built up elsewhere that could become nesting areas in time?)
- * How important is it to protect terns?
- * What are the rights of gulls?
- * What factors keep gulls at manageable levels elsewhere?
- * What conflicting human values come into play in this management questions?
- * How can human activities that adversely affect terns or overly encourage gull growth be managed in a "free society?"
- * How can dumps be environmentally controlled?
- * Who should pay for the costs of a tern protection program? Do benefits outweigh the costs?
- * Are present measures short-term or long-term solutions?
- * What are the key ingredients in a comprehensive wildlife management program?

Other wildlife management case studies can be considered. For example, research could be done on the overwintering of deer at Crane's beach where control of the herd is in question. A study of the impact of deer overpopulation on other species and on the fragile ecosystem brings up many of the same management questions, including when to intervene and which control measures to apply, and species management vs. concern for individual animals.



Vocabulary

8



Acid Rain - acid precipitation falling as rain

Adaptation - an alteration by which a species or individual improves its condition in relationship to its environment.

Airfoil - wing part which controls stability, direction, lift, thrust or propulsion.

Avicide - a poison for birds.

Bird Blind - a shelter for concealing bird watchers (or hunters).

Breed - the process of mating and reproducing offspring.
Captive breeding = in captivity.

Carnivore - an animal that eats other live animals.

Dissection - separating into pieces.

Ecological - interrelationship between living things and their environment.

Endangered - exposed to harm; in peril of survival.

Extinct - gone out of existence.

Family - a taxonomic category ranking below an order and above a genus.

Food Chain - succession of organisms in a community that constitute a feeding chain in which food energy is transferred.

Genus - (plural Genera) a taxonomic category ranking below a family and above a species; used either alone or followed by name of species.

Habitat - the place where a plant or animal normally lives.

Herbivore - an animal that eats plants.

Impoundment - water accumulated in a reservoir.

Insulation - material that prevents the passage of heat out or in.

Migration - regular (usually seasonal) movement of an animal species over significant distances.



Omnivore - an animal that eats both plant and animal food.

Ornithologist - a specialist in the branch of zoology dealing with birds.

Pecking Order - a hierarchy within flocks according to which each member submits to pecking and domination by stronger members and pecks and dominates weaker members.

Pellet - a small solid or densely packed ball or mass.

Pesticides - chemicals used to kill pests, especially insects and rodents.

Pollution - the contamination of soil, water, or the atmosphere by the discharge of harmful substances.

Predator - an animal that lives by preying on others.

Prey - a creature hunted or caught for food; quarry.

Rare - infrequently occurring.

Recycle - to use something again; or to reoccur.

Refuge - a place providing protection, shelter, sanctuary.

Regurgitate - to cast up partially digested food.

Rehabilitation - the restoring to a condition of health or useful activity.

Sanctuary - a refuge or reserved area in which animals (birds e.g.) are protected.

Species - basic unit of biological identity, consisting of organisms capable of interbreeding freely; Species are grouped into Genera and may be divided into subspecies or races.

Taxonomy - the science, laws or principles of classification.

Territoriality - a behavior pattern in animals consisting of the occupation and defense of a territory.

Selected References



Curriculum Materials

Birds. Nature Discovery Education Kit 1, Massachusetts Audubon Society, (see address below), basic kit starting at \$5.95, with additional options available. Grades 4-8, modify for younger.

Project Wild. Elementary and Secondary Activity Guides. Prepared by Fisheries and Wildlife groups around the country. Available through workshops. To find out about workshops offered in your area, or to have one presented to your group, contact Ellie Horwitz, Mass. Division of Fisheries and Wildlife, (617) 727-2969, or the Education Department of the Mass. Audubon Society, (617) 259-9500, addresses below.

Wildlife Habitat Conservation Education Teachers Pacs: Prepared by U.S. Fish and Wildlife Service; available through National Institute of Urban Wildlife, 10921 Trotting Ridge Way, Columbia, Maryland 21044. Ten subjects dealing with habitats and issues; \$5.00 a pac.

National Wildlife Day Kits: National Wildlife Federation annual program. Also back issues available on endangered species, etc. See also Class Project, on bird activities. Contact Mass. Wildlife Federation, c/o Paul Kress, (617) 369-3118, or at address below.

Magazines

Ranger Rick, especially for elementary school children. Ranger Rick, c/o National Wildlife Federation address. Also write for National Wildlife publication *Nature Scope*, issue devoted to Birds.

Curious Naturalist, for students and teachers, a Massachusetts Audubon Society magazine no longer in publication. Back issues and information sheets available from Public Information Office.

National Wildlife, for adults, a publication of the National Wildlife Federation.

Massachusetts Wildlife, for adults, a publication of the Massachusetts Division of Fisheries and Wildlife.

Organizations

Manomet Bird Observatory, P.O. Box 936, Manomet, MA 02345 — Wildlife research, bird banding; school programs, including "Birds Go To School."

Massachusetts Audubon Society, South Great Road, Lincoln, MA 01773 — Wildlife research, conservation and education; sanctuaries; library of curriculum materials, bird music films; bookshop; school programs.

Massachusetts Division of Fisheries & Wildlife, Public Information & Education, Field Headquarters, Westboro, MA 01581 — Publishes Mass. bird list and wildlife bulletins; manages sanctuaries and game farms; non-game and endangered species programs.

Massachusetts Division of Fisheries & Wildlife, Massachusetts Natural Heritage Program, 100 Cambridge Street, Boston, MA 02122 — Inventories rare, threatened and endangered species of Massachusetts.

Massachusetts Wildlife Federation, c/o Paul Kress, 295 East Riding Drive, Carlisle, MA 01741 — Distributes National Wildlife Week and other NWF wildlife educational materials in Massachusetts.

Metropolitan Boston Zoos, Franklin Park, Boston, MA 02121 — Adventure in Learning Program for Schools (Franklin Park and Stones Zoos). Adopt a bird through "Share in the Wild."

National Audubon Society, Educational Services, 950 Third Avenue, New York, NY 10022 — Aids for teachers and other classroom materials on birds.

National Wildlife Federation, 1412 16th St., N.W., Washington, D. C. 20036 — Publishes periodicals, books, stamps, posters, and audio-visuals; sponsors National Wildlife Day.

U.S. Fish & Wildlife Service, Northeast Division, 1 Gateway Center, Suite 700, Newton Corner, MA 02158 — Information on federal wildlife laws, management programs, endangered species; refuges and sites; fact sheets on Gull and Tern Management.





Books

- Drennan, Susan, ed, *Birder's Field Notebook*. New York: Doubleday, 1979.
- Field Guides to the Birds. Choose from many available, such as Peterson Field Guide Series of Houghton Mifflin, Golden Press Series, Macmillan Series, and others.
- Forbush, E. H., *Birds of Massachusetts and Other New England States*. 1925, 1927, 1929. Original volumes with color plates by L.A. Fuertes out-of-print. New black and white paperback version.
- George, Jean Craighead, ecological mysteries for elementary-junior high age, including *Who Killed Cock Robin?* Consult school library.
- Harrison, Hal H., *A Field Guide to Bird's Nests*. A Peterson Field Guide, New York: Houghton Mifflin, 1975.
- How to Attract Birds*. Illustrated with color photographs. Ortho Division, Chevron Chemical Co., 1983. Available at M.A.S. Giftshop.
- "Invite Birds to Your Home," pamphlet on conservation plantings for the Northeast; Soil Conservation Service, U.S. Department of Agriculture, n.d. Contact S.C.S. or Cooperative Extension Service nearest you.
- Lemmon, Robert S., *All About Birds*. New York: Random House, 1955, rev. ed.
- Massachusetts Audubon Society, *An Introduction to Massachusetts Birds*. 1975. Available from M.A.S. Public Information Office of Giftshop. \$1.50 plus tax (and mailing, handling charges).
- Massachusetts Division of Fisheries and Wildlife, *Wildlife Sanctuaries*. Westborough, Massachusetts 01581, 1979.
- Roth, Charles E., *The Wildlife Observer's Guidebook*. Prentice Hall, 1982.
- Terres, J. K., *Audubon Society Encyclopedia of North American Birds*. New York: Knopf, 1980.

